

NARROWBAND GAIN CONTROL OF RECEIVER WITH DIGITAL POST FILTERING

ABSTRACT OF THE DISCLOSURE

An Automatic Gain Control (AGC) circuit as used in a digital receiver that utilizes a main loop filter that is of a relatively wide bandwidth. A pre-filter, wideband variance is determined from the input digital signal, and a post-filter, narrowband variance is also determined. The wideband and narrowband variances are then compared to determine if the wideband signal power indicates a variance level that is too great to permit normal loop operation. By reapplying this difference in the power levels to the filter output as needed, such as by a scaling operation, the loss in dynamic range is effectively recovered. In a preferred embodiment, an adjustable gain input amplifier feeds an intermediate frequency (IF) signal to an analog-to-digital converter (ADC). The digitized IF signal is then down-converted to a baseband frequency and subjected to digital filtering. A narrowband sample variance (P_N) of the digitally filtered (narrowband) data is then determined. A wideband sample variance (P_w) is also taken from the raw ADC output data over the same period as the time period used for P_N . In the presence of out-of-band signal components, P_w will be quite different from P_N . This difference indicates a desired proportional difference in a control voltage or a gain backoff amount.